

### In the Claims

1. (currently amended) Luminescent silica gel particles containing a transparent silica gel matrix, said transparent silica gel matrix ~~which contain one or more~~ having at least one luminescent substance, substances in a transparent silica gel matrix and said particles exhibiting at least one property selected from the group consisting of ~~exhibit at least one of the properties set out below:~~

[[a]] the ~~particle size of said particles being~~ [[is]] at least 0.5 μm;

[[b]] said at least one ~~[[the]] luminescent substance of said particles substance(s) is/are~~ being selected from the group consisting of luminescent organic compounds, up-converting phosphors and luminescent proteins;

[[c]] said particles containing ~~they additionally contain~~ a magnetic colloid;

and

[[d]] said ~~[[the]] silica gel matrix of said particles including~~ [[has]] functional groups which can be coupled with biomolecules.

2. (currently amended) Particles according to Claim 1, ~~characterized in that they~~ wherein said particles are not self-fluorescent.

3. (currently amended) Particles according to Claim 1, ~~wherein or 2, characterized in that the~~ said at least one luminescent substance is substance(s) are encapsulated in said ~~[[the]]~~ particles.

4. (currently amended) Particles according to claim 1, wherein in accordance with any one of the preceding Claims, characterized in that the said at least one luminescent substance displays substance(s) is/are selected from the group of substances an energy transfer selected from the group consisting of ~~which display a~~ fluorescence, phosphorescence, chemoluminescence, electroluminescence ~~[[or a]]~~ and luminescence energy transfer.

5. (currently amended) Particles according to claim 1, wherein in accordance with any one of the preceding claims, characterized in that the concentration of ~~[[the]]~~ said at least one luminescent substance substances is 1 to 10%-wt.

6. (currently amended) Particles according to claim 1, wherein said at least one luminescent substance has an emission frequency and wherein any two of said at least one in accordance with any one of the preceding claims, characterized in that the luminescent substance substances display different emission frequencies.

7. (currently amended) Particles ~~in accordance with any one of the preceding claims, characterized in that the~~ according to claim 1, wherein said at least one luminescent

substance is a molecule having an excitation frequency and an emission frequency, and wherein substances are molecules whose said excitation frequency is higher than said [[the]] emission frequency.

8. (currently amended) Particles ~~in accordance with any one of Claims 1 to 6, characterized in that the~~ according to claim 1, wherein said at least one luminescent substance consists ~~substances consist~~ of semiconductor nanocrystals formed from elements selected from the groups of the periodic system consisting of [[the]] Group IIIA, Group [[and]] VA, Group IIB, [[and]] Group VIA [[or]] and Group IVA.

9. (currently amended) Particles according to ~~in accordance with~~ Claim 8, wherein ~~characterized in that the~~ said luminescent semiconductor nanocrystals are doped with at least one of copper and/or or silver additives.

10. (currently amended) Particles according to claim 1, wherein ~~in accordance with one of Claims 1 to 6, characterized in that the~~ said at least one luminescent substance ~~substances have~~ has an excitation frequency and an emission frequency and wherein said excitation frequency ~~frequencies that are~~ is lower than said [[the]] emission frequency frequencies.

11. (currently amended) Particles according to ~~in accordance with~~ Claim 10, ~~characterized in that the~~ wherein said at least one luminescent substance ~~substances are~~ is a microcrystalline compound ~~compounds~~ selected from the group consisting of rare earths and and/or yttrium having at least one element ~~with elements from the Group VIA and/or or the Group VIIA.~~

12. (currently amended) Particles ~~in accordance with any one of the preceding Claims, characterized in that the~~ according to claim 1, wherein said at least one luminescent substance ~~substances are~~ is a metal-chelate compound having a central atom, said compounds whose central atom has been chosen being selected from the group of the periodic system consisting of Group VIII, Group IB, Group IIB and ~~or the group of~~ rare earths.

13. (currently amended) Particles ~~in accordance with any one of the preceding Claims, characterized in that the~~ according to claim 1, wherein said at least one luminescent substance ~~substances are~~ is a pyrrole dye [[dyes]].

14. (currently amended) Particles according to claim 1, wherein said ~~in accordance with Claims 1 to 6, characterized in that the~~ luminescent substance is a ~~substances are~~ luminescent protein ~~proteins.~~

15. (currently amended) Luminescent polymer particles comprising:

a transparent silica gel matrix;

at least one luminescent substance in said transparent silica gel matrix; and

~~in accordance with any one of Claims 1 to 14 in which, in addition, a magnetic colloid is contained or has been encapsulated.~~

16. (currently amended) Particles according to ~~in accordance with~~ Claim 15, ~~characterized in that the~~ wherein said magnetic colloid is selected from the group comprising ferro-magnetic compounds, ferri-magnetic compounds, [[and]] superparamagnetic compounds and ferrofluids.

17. (currently amended) Particles ~~in accordance with Claim 15 or 16, characterized in that the~~ according to claim 15, wherein said magnetic colloid is present in a concentration of 10-50% by weight relative to the polymer particle.

18. (currently amended) Particles according to claim 1, in accordance with any one of the preceding Claims, characterized in that the wherein said silica gels have functional groups that can be coupled to at least one biomolecule biomolecules, said at least one biomolecule being selected from the group consisting of comprising proteins, peptides, cell receptors, nucleic acids, nucleic acid fragments, polysaccharides, oligosaccharides, antibodies, antibody-fragments, streptavidin, avidin, biotin and enzymes, ~~or that are coupled to one or more of such biomolecules.~~

19. (currently amended) A process Process for the production of luminescent silica gel particles which contain a transparent silica gel matrix having at least one or more luminescent substance substances in said a transparent silica gel matrix particles, said process comprising the steps of: more particularly for the production of luminescent silica gel particles according to any one of Claims 1 to 18, characterized in that

[[a]]] condensing a mixture consisting of a diluted acid and alkoxysilanes is ~~condensed~~ to a clear silica sol;[[,]]

[[b]]] homogenously mixing the clear silica sol ~~is homogeneously mixed~~ with at least one or more luminescent substance to form a sol-luminescence substance mixture; substances;

[[c]]] dispersing the sol-luminescence substance mixture ~~is dispersed~~ in an organic phase that is not miscible with water; and

[[d]]] adding a base to the sol-luminescence substance mixture is cross-linked during or after said dispersing step in order to cross-link said sol-luminescence substance mixture dispersion by adding a base.

20. (canceled)

21. (currently amended) ~~The process according to claim 19, wherein said Process for the production of luminescent silica gel particles in accordance with Claims 19 and 20, characterized in that the organic phase that is not miscible with water contains at least one or more surfactive substance substances in a concentration of 0.1 to 15 % by volume~~

22. (currently amended) ~~The process according to claim 19, wherein Process for the production of luminescent silica gel particles in accordance with any one of Claims 19 to 21, characterized in that the volume ratio of sol to organic phase is 1:5 to 1:30.~~

23. (currently amended) ~~The process according to claim 19, wherein Process for the production of luminescent silica gel particles in accordance with any one of Claims 19 to 22, characterized in that the dispersion cross-linking process takes said dispersing and cross-linking steps have a duration of 2 to 30 seconds.~~

24. (canceled)

25. (currently amended) ~~Use of A sensor for array technology or for nucleic acid sequencing comprising luminescent silica gel particles containing a transparent silica gel matrix and at least one or more luminescent substance substances in said [[a]] transparent silica gel matrix, more particularly the use of luminescent silica gel particles according to any one of Claims 1 to 18 or of silica gel particles produced according to any one of claims 19 to 24, for at least one of the analysis or and/or diagnostic testing of nucleic acids, nucleic acid fragments, proteins, peptides, antibodies, antibody fragments, cells, cell receptors[[,]] and biotinylated biomolecules and [[for]] testing protein or nucleic acid libraries, as sensors in the context of array technology or for nucleic acid sequencing.~~

26. (new) The process according to claim 19 and further comprising the step of adding a substance selected from the group consisting of a ferro-magnetic substance, a ferri-magnetic substance and a superparamagnetic substance to the sol-luminescence substance mixture in an amount of 10-50% by weight.

27. (new) The process according to claim 19, and further including the step of mixing an aqueous solution of organic polymer, a polysaccharide or a protein in an amount of 1-20% by volume with the sol before said dispersing step.